Octonions and exceptional Lie algebras

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It is well known that octonions (both real and complex) are very involved in the structure of the exceptional Lie algebras. We will explore several aspects of this relationship: how octonions provide models of the exceptional Lie algebras, coordinatizating them by means of structurable algebras. This plays an important role in the description of their inner ideals, and, in turn, these appear naturally in certain point-line geometries. In general, these constructions are related to gradings over the integers. We will use also the octonions and related structures to approach gradings on exceptional Lie algebras but over finite groups. Contrary to the situation above, these gradings are related to semisimple elements, and the nice symmetry behind the constructions is reflected in the corresponding Lie groups and in Particle Physics.